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The Effect of Descriptive Norms on Pregaming Frequency: Tests of Five Moderators

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Abstract

Background—Pregaming is highly prevalent on college campuses and associated with heightened levels of intoxication and risk of alcohol consequences. However, research examining the correlates of pregameing behavior is limited. Descriptive norms (i.e., perceptions about the prevalence or frequency of a behavior) are reliable and comparatively strong predictors of general drinking behavior, with recent evidence indicating that they are also associated with pregameing.

Objectives—We tested the hypothesis that higher descriptive norms for pregameing frequency would be associated with personal pregameing frequency. We also tested whether this effect would be stronger in the context of several theory-based moderators: female gender, higher injunctive norms (i.e., perceptions of others' attitudes toward a particular behavior), a more positive attitude toward pregameing, a stronger sense of identification with the drinking habits of other students, and stronger social comparison tendencies.

Methods—College student drinkers (N=198, 63% female) participated in an online survey assessing frequency of pregameing, descriptive norms, and hypothesized moderators.

Results—A multiple regression model revealed that higher descriptive norms, a more positive attitude toward pregameing, and stronger peer identification were significantly associated with greater pregameing frequency among drinkers. However, no moderators of the association between descriptive norms and pregameing frequency were observed.

Conclusions/Importance—Descriptive norms are robust predictors of pregameing behavior, for both genders and across levels of several potential moderators. Future research seeking to understand pregameing behavior should consider descriptive norms, as well as personal attitudes and identification with student peers, as targets of interventions designed to reduce pregameing.

Keywords

pregameing; prepartying; descriptive norms; alcohol; college students; social comparison; attitudes; injunctive norms; gender

Introduction

Pregaming (a.k.a. prepartying, pre-loading, or pre-drinking) involves drinking prior to attending a social event at which more alcohol may or may not be consumed. At both the global and event levels, students who pregame consume significantly more alcohol and experience greater levels of intoxication and alcohol-related negative consequences than student drinkers who do not pregame (Borsari, Boyle, et al., 2007; Hummer, Napper, Ehret, & LaBrie, 2013; Kenney, Hummer, & LaBrie, 2010; Merrill, Vermont, Bachrach, & Read, 2013). As many as three-quarters of college student drinkers engage in this risk behavior (DeJong, DeRicco, & Schneider, 2010; Pedersen & LaBrie, 2007). Despite the high prevalence rates and associated risks, studies examining the psychosocial predictors of pregame behavior are primarily limited to motivations for pregame (for review see J. H. Foster & Ferguson, 2013). The present study sought to fill this gap by examining the role of descriptive norms on pregame frequency, as well as potential moderators of this effect.

Gaining a better understanding of how psychosocial factors in the college context influence pregame behavior can inform prevention approaches aimed at reducing this high-risk drinking activity. Recently, Caudwell and Hagger (2015) examined the influence of motivational and social-cognitive pathways on pregame behavior in a sample of undergraduate pregamers. The results showed that personal attitudes toward pregame and subjective norms (others' approval of participant's engagement in pregame) partially mediated the relationship between autonomous motivation and intentions to pregame; intentions, in turn, predicted pregame frequency at follow-up. However, more research is needed to explicate additional theoretically based psychosocial factors that influence pregame behaviors.

While several studies document that descriptive norms (i.e., perceptions about the prevalence or frequency of a behavior) are robust predictors of drinking behavior in college students (Borsari & Carey, 2001, 2003; Borsari, Murphy, & Barnett, 2007; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007), less is known about links between descriptive norms for pregame and pregame behavior. If descriptive norms for pregame are related to pregame behavior, then providing students with pregame-specific normative feedback (e.g., informing an individual that other students do not pregame as often as he/she thinks they do, or as often as he/she does him/herself) may be useful. Further, identifying *for whom* descriptive norms do or do not influence pregame behavior will assist in the determination of those most or least likely to benefit from such an approach. The present study aims to inform such efforts.

Descriptive Norms and Pregaming

Students consistently overestimate how frequently and excessively peers drink, and these misperceptions lead individuals to drink more heavily themselves (Berkowitz, 2004; Borsari & Carey, 2003; Carey, Borsari, Carey, & Maisto, 2006). The few studies that have applied the social norms perspective to pregame-specific descriptive norms find results consistent with the general drinking literature: college students tend to overestimate other students' pregame behaviors, including how often typical students pregame (DeJong et al., 2010; Pedersen & LaBrie, 2008) and how much they drink while pregame (Burger, LaSalvia,

Hendricks, Mehdipour, & Neudeck, 2011; Pedersen & LaBrie, 2008). Further, evidence suggests that students' perceived pregaming norms influence their own pregaming behaviors. For instance, normative perceptions of typical student pregaming strongly correlate with actual pregaming (Pedersen & LaBrie, 2008). In addition, Burger et al. (2011) demonstrated that female college students presented with underestimated norms information (i.e., that 27% of students pregame, a figure below the actual pregaming level but high enough to be credible) later engaged in significantly less pregaming relative to participants in the control condition with no presentation of norms.

In sum, the limited research examining the role of pregaming-specific descriptive norms has established their relevance but has not yet identified factors that might moderate their influence. Understanding descriptive norm influences on pregaming behavior, including the factors that moderate that influence is needed to identify those students at greatest risk for pregaming-related consequences. Below, we review several psychosocial variables highlighted by theory or prior research as potential moderators of the effect of descriptive norms on pregaming behavior.

Potential Moderators

Injunctive Norms—Like descriptive norms, injunctive norms (i.e., perceptions of others' attitudes toward a particular behavior) influence drinking behaviors; perceiving that peers hold more positive attitudes toward drinking is associated with increased personal consumption (Borsari & Carey, 2003; LaBrie, Hummer, Lac, & Lee, 2010). A strong correspondence between descriptive and injunctive norms is generally observed, with higher descriptive and injunctive drinking norms associated with greater drinking acceptability and behaviors (D. W. Foster, Neighbors, & Krieger, 2015). However, an individual may also hold divergent descriptive and injunctive norms, warranting examination of their independent effects (Cialdini, Reno, & Kallgren, 1990; Lapinski & Rimal, 2005). To our knowledge, only two studies have examined the effects of injunctive norms on pregaming. In Caudwell and Hagger's (2015) study, greater perceived approval from others about one's engagement in pregaming was correlated with pregaming frequency and predicted pregaming via greater intentions to pregame (Caudwell & Hagger, 2015). In Rutledge, McCarthy, and Lendyak (2014), pregame-specific injunctive norms was a significant predictor of alcohol consumed while pregaming (i.e., pregaming quantity) among men, independent of pregaming descriptive norms. Still, results were far from conclusive; pregaming injunctive norms, after controlling for pregaming descriptive norms, did not predict pregaming quantity among women or pregaming frequency with respect to either gender.

Research indicates that norms may be most influential when both descriptive and injunctive norms align to support a target behavior (Cialdini, 2003; Reid, Cialdini, & Aiken, 2010). The theory of normative social behavior (TNSB; Rimal & Real, 2005) suggests that although injunctive norms exert direct influence on behavior, of primary importance is the extent to which injunctive normative beliefs strengthen the influence of descriptive norms on behaviors. That is, descriptive norms for a behavior may be particularly influential when that behavior is perceived to be viewed favorably by others. Foster et al. (2015) found that typical student descriptive and injunctive drinking norms interacted to predict drinking and

number of acceptable drinks. Lee, Geisner, Lewis, Neighbors, and Larimer (2007) found a similar interaction related to close friend descriptive and injunctive drinking norms on personal drinking among first-year college students, but only among those with high social motives for drinking. In contrast, Rimal and Real (2005) did not support an interaction between descriptive and injunctive drinking norms in an incoming college student sample. In sum, despite some indication that individuals who hold stronger norms of both types will engage in the riskiest levels of drinking (e.g., more frequent pregaming), the relationship between descriptive and injunctive norms is not fully understood. Further, no studies to date have examined whether injunctive and descriptive norms for pregaming interact to predict pregaming behavior. In the current study, we address this question by examining the potential influence of pregaming injunctive norms in the pregaming descriptive norms-behavior relationship.

Gender—Studies examining the potential moderating effect of gender in the relationship between descriptive norms and drinking behavior among young adults have revealed conflicting results. Some studies show a stronger influence among male than female college students (Larimer, Turner, Mallett, & Geisner, 2004; O'Grady, Cullum, Tennen, & Armeli, 2011), although descriptive norms were more strongly predictive of risky drinking in non-college emerging adult women (Scaglione, Turrise, Cleveland, Mallett, & Comer, 2013). Among college athletes, the link between descriptive drinking norms among friends who were athletes and personal drinking was stronger among college males whereas non-athlete friend norms were more influential to drinking among women (Martens, Dams-O'Connor, Duffy-Paiement, & Gibson, 2006). In a recent study, Merrill, Carey, Reid, and Carey (2014) found no gender differences in the relationship between descriptive norms of same-sex friends and a range of drinking outcomes following a sanctioned intervention. These conflicting findings may be due in part to the different populations from which the samples were drawn and point to the need for additional research to clarify gender effects.

With respect to pregaming, evidence suggests that females may be more influenced by descriptive norms than males. Rutledge and colleagues (2014) found that descriptive norms related to the *quantity* of typical students' alcohol consumption while pregaming (but not frequency) was associated with past year pregaming frequency, after controlling for pregaming injunctive norms, in college women but not men. Further, as mentioned previously, Burger and colleagues (2011) demonstrated that women, but not men, responded to artificially low descriptive norms feedback by reducing frequency of pregaming relative to same-sex controls. Although sparse, these findings point to the potential moderating effects of gender in the link between descriptive norms and pregaming behaviors, and indicate that descriptive norms might be more strongly linked to pregaming behavior in women. Addressing how this relationship may differ as a function of gender is critically important to future norms interventions that aim to reduce pregaming-related risk.

Attitude—It is well established that students holding more positive personal attitudes toward heavy drinking consume significantly more alcohol than students with less positive attitudes (Crawford & Novak, 2006; Mallett, Turrise, Larimer, & Mastroleo, 2009). Although less is known about the relationship between pregaming attitudes and behavior, Caudwell

and Hagger (2015) found a positive bivariate correlation as well as a significant pathway from more positive attitudes about pregameing to greater pregameing participation that was mediated by intentions to pregame. According to the theory of reasoned action, attitudes and perceived peer norms independently explain behavior (Ajzen, 1988). Consistent with theory, both descriptive norms and attitudes correlate with and independently predict willingness to drink (Litt & Stock, 2011). Crawford and Novak (2010) found that drinking attitudes and descriptive norms interacted such that students holding higher descriptive norms and higher (versus lower) pro-drinking attitudes reported more drinking. Thus, it is plausible that students holding both higher descriptive norms and more positive attitudes toward pregameing will be particularly likely to engage in pregameing.

Identification—Greater identification with other college students is associated with greater levels of alcohol consumption (Reed, Lange, Ketchie, & Clapp, 2007; Rimal & Real, 2003). In addition, both TNSB (Rimal & Real, 2005) and the social identity perspective (Hogg, Abrams, Otten, & Hinkle, 2004) posit that the relationship between descriptive norms and behaviors is strengthened when students identify with the normative referent group. Group identification is usually considered broadly, as opposed to on specific dimensions, and is measured accordingly (Rimal & Real, 2003; Neighbors et al., 2010). In the context of alcohol use, greater identification with a referent group (e.g., typical same-sex student) moderated the association between referent-specific drinking descriptive norms and personal alcohol consumption (Neighbors et al., 2010). Identifying with peers' general drinking behaviors should predict engagement in normative social drinking behaviors such as pregameing, and the relationship between descriptive norms and pregameing should be stronger among students closely identifying with peers.

Social Comparison—According to social comparison theory (Festinger, 1954), individual behaviors are guided by how one compares him/herself to others, and greater orientation toward social comparison is related to higher salience of perceived peer behaviors (Buunk & Gibbons, 1997). Litt and colleagues provided empirical support for these theory-based relationships by finding that social comparison orientation moderated the relationship between perceived drinking descriptive norms and both alcohol-related consequences (Litt, Lewis, Stahlbrandt, Firth, & Neighbors, 2012) and behavioral willingness to drink (Litt, Stock, & Gibbons, 2014). Further, in a sample of college students mandated to intervention, higher descriptive norms were associated with more drinking, but only among those who engaged in higher levels of social comparison (Carey, Merrill, Lust, Kalichman, & Carey, 2014). Based on theory and preliminary empirical findings, the relationship between pregameing descriptive norms and behaviors should be stronger among students with stronger social comparison orientation; that is, students who look to others for behavioral guidance should be particularly influenced by perceived descriptive norms related to pregameing.

The Present Study

Based on extensive norms research, we hypothesized that higher descriptive norms for pregameing frequency would be significantly associated with personal pregameing frequency. In addition, we identified several theory-based psychosocial variables that should enhance

the effects of perceived descriptive norms. Because (a) no single theory encompasses all the variables that could potentially be important in understanding the influence of descriptive norms on behavior, and (b) there is limited research examining the role of descriptive norms on pregameing to date, and what has been done has been largely atheoretical, we sought to be more inclusive, rather than restrict our analyses to variables that would be suggested by one theory alone. In an effort to explore which variables might be useful to test more rigorously in future research, we hypothesized that descriptive norms would be stronger predictors of pregameing frequency in the context of five moderators: higher injunctive norms, female gender, more positive attitude toward pregameing, a stronger sense of identification with other students, and stronger social comparison tendencies. While other variables have also been shown to moderate the effect of descriptive norms on drinking (e.g., social anxiety; Buckner, Eckner, & Proctor, 2011), the most empirical and theoretical support is available for these five moderators. Though we did not present hypotheses regarding their unique effects, the main effect influence of each potential moderator indicated above was also examined.

Method

Participants and Procedure

Students (N=234) at a large northeastern university were recruited from introductory psychology classes to participate in an online survey during the spring semester of 2014. To be eligible, participants had to be at least age 18 and able to complete surveys in English. Upon arrival to the laboratory, study procedures were explained, participants provided informed consent, and then they completed an online survey in a private cubicle. The survey typically took less than 30 minutes to complete, and participants received academic credit. No other incentives for participation were provided. All procedures were approved by the university's Institutional Review Board. One participant's data was not saved due to technical difficulties. In addition, we excluded non-drinkers (n=32), three participants who did not provide norms data, and one non-traditional college student (age 41), leaving N=198 participants (age 18–25) with complete data for analysis.

Measures

Demographics—Participants provided information regarding age, gender, year in college, ethnicity, and race.

Alcohol Use Behavior in the Past Month—Measures of past month drinking behavior were used for descriptive purposes. Alcohol use patterns were measured using an adapted form of the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). After reading a definition of a standard drink (12 oz. of beer; 5 oz. of 12% table wine; 12 oz. of wine cooler; or 1.25 oz. of 80-proof liquor), participants indicated on a grid how many drinks they typically consumed on each day. This allowed for calculation of typical weekly drinks, drinks per drinking day, and frequency of drinking. Participants also entered the number of times in the past month they consumed 4+ (females)/5+ (males) drinks on one drinking occasion (Wechsler, Dowdall, Davenport, & Rimm, 1995) to obtain a heavy episodic drinking frequency score.

Pregaming behavior—Participants were asked “Since coming to school this year, have you done any pregame?” If they responded affirmatively, they were asked “How often do you pregame?” Response options included 1=never, 2=less than once per semester but at least once per year, 3=less than once per month but at least once per semester, 4=once per month, 5=2-3 times per month, 6=once per week, and 7=more than once per week. For descriptive purposes, participants were asked “How much do you typically drink when you pregame” and “What do you typically drink when you pregame?” with “check all that apply” response options of beer, wine, mixed drinks, shots.

Descriptive Norms for Pregaming—A descriptive norms item was designed to parallel the personal frequency of pregame item; the principle of designing parallel items has precedent in Park and Smith (2007). All participants were asked to indicate how often they thought the typical student at their university pregame. Response options matched those used to assess personal pregame frequency.

Injunctive Norms for Pregaming—A pregame-specific injunctive norms item was designed following precedent for injunctive norms measurement (Baer, 1994). Specifically, participants were asked to rate how the typical student at their university feels about pregame, on a scale of 1 (very negatively) to 5 (very positively).

Personal Attitude towards Pregaming—A personal attitude item was designed to parallel the injunctive norms for pregame item, reflecting personal rather than other approval. Participants were asked to rate how they personally feel about pregame, on a scale of 1 (very negatively) to 5 (very positively).

Identification—Using an item adapted from Rimal and Real (2005), participants responded to an item that asked “How much do you identify with/feel similar to other students at this university in terms of your drinking habits?” with response options ranging from 1 (not at all similar) to 5 (very similar).

Social Comparison Orientation—The 11-item Iowa-Netherlands Comparison Orientation (INCOM) Scale (Gibbons & Buunk, 1999) has been validated and remains one of the prominent social comparison measures used in research today (Franklin & Chekaluk, 2011; Gibbons & Buunk, 1999; Rinn, Jamieson, Gross, & McQueen, 2009). Participants were asked to indicate how much they agreed with each statement (e.g., “I always pay a lot of attention to how I do things compared with how others do things,” “I always like to know what others in a similar situation would do.”) on a scale of 1 (strongly disagree) to 5 (strongly agree). Internal consistency of the INCOM in this sample was good (Cronbach's $\alpha = .80$).

Analytic plan

Pregame frequency was normally distributed. To test our hypothesis that higher descriptive norms would be significantly associated with personal pregame frequency, we first examined bivariate correlations among predictor and criterion variables. To test our hypotheses regarding variables that may enhance the effects of perceived descriptive norms

on pregaming, a multiple regression model was used. Descriptive norms, each moderator of interest, and their interaction terms were entered simultaneously into the model. All continuous variables were centered at their mean prior to forming the interactions (Aiken & West, 1991). The lowest tolerance of all predictors was .66, indicating that collinearity among predictors was not an issue (Tabachnick & Fidell, 2007). Finally, though not the central aim of our study, we examined not only the interaction terms of this model, but also whether the proposed moderators exerted unique main effect influences on pregaming, above and beyond effects of descriptive norms.

Results

Descriptives

Demographics—Of the total analytic sample ($N=198$), 63% were female and the average age was 19.2 ($SD=1.2$). The majority of the sample was in either their freshman (49%) or sophomore (35%) year. Most self-identified as White (78%), while 10% self-identified as Black, 10% as Asian, and 2% as other/unknown. Eleven percent endorsed Hispanic ethnicity.

Drinking and Pregaming Behavior—On average, participants drank 2.27 ($SD=1.21$) times per week. They consumed 9.94 ($SD=10.09$) drinks per week, and 3.91 ($SD=2.52$) drinks per drinking day. The average frequency of heavy episodic drinking in the past month was 3.62 ($SD=3.86$). Of the full sample of 198 drinkers, only 16 (8%) reported that they had not pregamed since the start of the academic year. Both the median and mode of the frequency of pregaming score was 5, representing between 2-3 times per month; and participants reported consuming an average of 3.71 ($SD=1.81$) drinks while pregaming. Frequency of drink types that students reported they consumed during pregaming included 70% ($N=123$) shots, 60% ($N=107$) mixed drinks, 40% ($n=72$) beer, and 15% ($n=26$) wine.

Predictor Variables—Summary statistics on predictor variables and correlations among all model variables appear in Table 1. In support of our first hypothesis, higher descriptive norms were associated with higher frequency of pregaming. Attitudes and identification also were positively correlated with pregaming frequency at the bivariate level. Of note, participants reported perceptions that other students at the university pregamed significantly more frequently than the students in this sample actually did ($t = 10.94$, $df = 197$, $p < .001$).

Substantive Models

Results of the multiple regression model examining pregaming frequency as an outcome are included in Table 2. Descriptive norms remained significant in this multivariate context, providing further support for our first hypothesis. However, we observed no significant interactions with descriptive norms. Note that testing each interaction term in a separate model resulted in similar findings. Though not the focus of our hypotheses, higher levels of identification and attitudes were also significantly associated with higher pregaming frequency. Unexpectedly, higher levels of injunctive norms were associated with lower levels of pregaming frequency in the multivariate model. This combined model predicted 55% of the variance in pregaming frequency (adjusted $R^2 = .55$).

Discussion

Higher descriptive norms for pregaming frequency by other students at the university consistently predicted the pregaming frequency of individuals in our sample. This finding is consistent with observations that perceived norms for drinking in specific contexts predict personal drinking behavior within those contexts (Lewis et al., 2011), extending the finding to pregaming. Taken together with a handful of other studies (Burger et al., 2011; DeJong et al., 2010; Pedersen & LaBrie, 2008), a growing literature documents the relevance of descriptive normative perceptions of pregaming for explaining this behavior.

Contrary to predictions, we did not find evidence of any moderators of the descriptive norms effect; descriptive norms appear to exert a robust influence on pregaming behavior, for both genders and regardless of levels of other psychosocial variables measured here (personal attitudes, injunctive norms, identification, social comparison). Although prior research and theory has suggested that the influence of perceived descriptive norms might be enhanced or mitigated by other psychosocial variables, in some cases these interactions are relatively small in magnitude (e.g., injunctive norms and group identification; Rimal, 2008) or findings have been mixed (e.g., identity; Rimal & Real, 2003; gender; Martens et al., 2006; Merrill et al., 2014). Given our findings, it is possible that the TNSB framework, which would suggest that effects of descriptive norms are moderated by injunctive norms and/or the extent to which one identifies with the normative referent group, may not apply to pregaming behavior. Alternatively, in situations where the base rate of the behavior is high (e.g., 92% of our sample engaged in pregaming) and/or the perceived descriptive norms are relatively high, ceiling effects may make it hard to detect moderation. Replication in other samples with a greater range of pregaming behavior and pregaming norms is warranted.

While the aim of our study was to examine moderators of descriptive norm effects on pregaming, our exploratory analysis of the main effects of these moderators revealed some interesting results. In a multivariate model including descriptive norms, more positive attitudes toward pregaming, and stronger identification with the drinking behavior of other university students were also significantly and independently associated with more frequent pregaming. Positive personal attitudes toward pregaming emerged as the strongest predictor, explaining 17% of the variance in pregaming frequency. Consistent with the tenets of Theory of Reasoned Action (Ajzen, 1988) related specifically to the role of personal attitudes and social norms, our findings suggest that both attitudes and perceived peer norms independently explain how often students engage in pregaming. Feeling similar to fellow students with regard to general drinking habits helped to explain variance in pregaming frequency independent of perceived pregaming norms, indicating that these are not overlapping constructs. Thus, assuming an average perceived norm, participants who felt dissimilar to peers with respect to their drinking would pregame less and those who felt more similar to peers would pregame more. This variable might be interpreted as a marker of sociability or social connectedness, and deserves to be further explored as a predictor of pregaming,

²The strength and magnitude of final model results did not differ in the larger sample that also included non-drinkers.

When included in the same model as descriptive norms and other psychosocial variables, we observed a negative association between perceived approval of pregaming (i.e., injunctive norms) and levels of one's own frequency of pregaming. Taken at face value, this suggests that, at average levels of all other predictors, the perception that others view pregaming more positively is associated with less frequent personal pregaming. Notably however, injunctive norms were positively (though non-significantly) associated with pregaming at the zero-order correlation level. Thus, the direction of the effect of injunctive norms is unexpected when accounting for variance related to descriptive norms and attitudes. Statistically, such a pattern of findings is characteristic of a negative suppression effect (Maassen & Bakker, 2001)¹. Although inconsistent with theory and potentially a statistical artifact, similar findings have been observed elsewhere. In one study, while perceptions of other students' approval of gambling were overestimated, they were negatively associated with gambling (Neighbors, Lostutter, et al., 2007). In another, perceived approval by the typical student was negatively associated with one's own alcohol use in the context of other injunctive and descriptive norms (Neighbors et al., 2008). It appears that once accounting for the influence of important factors such as the perceived *behavior* of others (descriptive norms) and *personal* attitudes toward pregaming, perceived attitudes of others may not be as important with respect to the remaining variance in personal pregaming that can be explained. Of note, we used the typical student at one's university as a referent group, while theories such as TNSB (Rimal & Real, 2005) highlight importance of the approval of more distal referent groups and those with authority (e.g., university administrators, parents). Had we used such distal referents, or, alternatively, more proximal ones (e.g., close friends of your gender), findings may have differed (Neighbors et al., 2008).

Clinical Implications

More than 9 out of 10 student drinkers in our sample endorsed pregaming, a behavior shown in prior research to be clearly linked to higher risk for alcohol-related problems (Borsari, Boyle, et al., 2007; Hummer et al., 2013; Kenney et al., 2010; Merrill et al., 2013). Despite this, to date, interventions specifically targeted toward pregaming behavior have not been developed and tested empirically. Our results suggest that such an intervention would be useful, and could benefit from a component focused on descriptive norms. Modeled after brief interventions targeting general drinking behavior (Carey, 2012), this might involve demonstrating discrepancies between one's perception of the norm and the actual norm for

¹We caution the reader in the interpretation of the negative effect of injunctive norms on pregaming frequency, as this may be a statistical artifact. According to Maassen & Bakker (2001), either one or a linear composite of independent variables can produce a suppressor effect. To meet the definition for *negative suppression*, the two (or more) independent variables first must have a positive zero-order correlation with the dependent variable and correlate positively with each other. As can be seen in Table 1, injunctive norms are positively (though non-significantly) associated with the dependent variable (pregaming frequency), and most strongly positively associated with descriptive norms. Second, negative suppression is shown when one of the independent variables receives a negative regression weight, as is the case for the association between injunctive norms and pregaming frequency. This may be a reflection of the fact that although descriptive and injunctive norms each share relevant information with pregaming frequency, they share fewer common elements with pregaming frequency than the common elements of *irrelevant* information shared between injunctive and descriptive norms. To test this assumption, we ran a separate model including only injunctive norms and descriptive norm as predictors. Here, the effect of injunctive norms was again negative and significant ($B = -.37, p = .03$). A similar finding is observed if descriptive norms are replaced with personal attitudes, which was also correlated with injunctive norms (i.e., only personal attitudes and injunctive norms as predictors of pregaming); in this model, injunctive norms are again negative and significant ($B = -.32, p = .02$). Findings suggest that either personal attitudes or descriptive norms may suppress effects of injunctive norms on pregaming frequency. The variance shared between injunctive norms and either of these other two predictors may account for the false appearance of a negative relationship between injunctive norms and pregaming frequency.

pregaming frequency, given that a misperception exists. In addition, discrepancies between one's own pregameing behavior and that of other students (when one is pregameing more often than others) could be highlighted, in order to motivate personal reductions in such behavior. Understanding that universities may not want to implement an intervention focused on a single high-risk behavior, an alternative to a stand-alone pregameing intervention would be to incorporate pregame-specific normative feedback components into a more general intervention package for college drinking. Given that we did not observe any of the variables examined to moderate the impact of descriptive norms, this might be expected to be useful regardless of a student's level of injunctive norms, personal attitudes, social comparison tendencies, identification, or gender. Beyond descriptive norms, our findings highlighted personal attitudes as another prominent correlate (and theoretical determinant) of pregameing frequency. As such, these variables are important to consider in future research seeking to understand pregameing behavior. Whether any of the study variables shown to correlate with pregameing frequency may serve as effective targets of college drinking interventions remains to be tested.

Limitations and Future Directions

Due to the cross-sectional nature of these data, we are unable to ascertain whether significant psychosocial variables predict pregameing frequency, or vice versa. For example, it is possible that participants who pregame more often report higher perceived frequency of pregameing among others because they are more often in contexts where they observe such behavior. Longitudinal research in this area is a natural next step. We did not provide a specific definition of pregameing in the study questionnaires, leaving open the possibility that some participants interpreted the questions differently than others.

In the present study we chose to match assessment of norms and attitudes to the target behavior we wanted to predict (pregameing). As such, because our descriptive norms variable was linked to pregameing frequency, we chose only to look at pregameing frequency (and not quantity) as an outcome. Future studies should include measures of norms that map well on to the behavioral outcomes that are assessed, to tease apart whether there are unique influences of norms on different measures of behavior. On the other hand, it may also be useful to examine whether norms and attitudes linked to drinking in general (as opposed to pregameing specifically) are predictive of pregameing behavior. It is possible that general drinking cognitions are linked to increased pregameing behavior, in which case separate measurement of pregameing-specific constructs may be unnecessary.

We used single item measures for norms, attitudes, and identification. Multi-item measure of these constructs may be more reliable and better suited for testing interactions, leaving yet another opportunity for future research. Finally, prior research demonstrates that pregameing behavior may vary by ethnic group (Paves, Pedersen, Hummer, & LaBrie, 2012); however, the small sample size of Asians, Blacks, and Hispanics limits any in-depth understanding of the role of racial/ethnic factors on pregameing behaviors in the present study.

Conclusion

The current study highlights the importance of pregaming-specific descriptive norms in understanding college students' personal pregaming engagement. These findings support the potential utility of harm reduction interventions that address pregaming and that incorporate descriptive normative feedback on pregaming. Further, although no studies to date have examined the influence of personal attitudes toward pregaming or identification with college peers' drinking on pregame behaviors, we found that more positive attitudes and greater peer identification predicted pregaming frequency, over and above descriptive norms. These findings suggest future directions to be explored to better understand the prevalent and risky pregaming behaviors among young adults.

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Glossary

Descriptive Norms	Perceptions about the prevalence or frequency of a behavior.
Injunctive Norms	Perceptions of others' attitudes toward a particular behavior.
Pregaming	Also referred to as prepartying, pre-loading, prefunking, front-loading or pre-drinking, pregaming involves drinking prior to attending a social gathering or event at which more alcohol may or may not be consumed.

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Table 1

Descriptives and Correlations among Model Variables

	1	2	3	4	5	6	7	M (SD)
1. Pregaming Frequency	1							4.63 (1.78)
2. Descriptive norm	.33 **	1						5.97 (0.98)
3. Gender (1=Female)	-.10	.23 **	1					-----
4. Injunctive norm	.02	.44 **	.09	1				4.34 (0.77)
5. Attitude	.63 **	.16 *	-.16 **	.23 **	1			3.81 (0.91)
6. Identification	.49 **	.07	-.09	-.06	.40 **	1		2.97 (1.19)
7. Social Comparison	.03	-.02	.11	.10	.07	.19 *	1	40.92 (5.84)

**
p<.01,*
p<.05

Table 2

Multiple Regression Model Predicting Pregaming Frequency

Predictor	<i>B</i>	β	<i>p</i>	<i>Sr2</i>
Descriptive Norms	.61	.34	<.001	.08
Injunctive Norms	-.51	-.22	<.001	.03
Gender (1=Female)	-.11	-.03	.55	<.001
Attitude	.98	.49	<.001	.17
Identification	.38	.25	<.001	.05
Social Comparison	-.01	-.02	.71	<.001
Descriptive $\times$ Injunctive	.08	.04	.49	<.001
Descriptive $\times$ Gender	.27	.07	.16	.004
Descriptive $\times$ Attitude	-.21	-.10	.06	.008
Descriptive $\times$ Identification	.03	.02	.68	<.001
Descriptive $\times$ Social Comparison	.01	.03	.53	<.001